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Interplay Between Hydrogen Sulfide and Adrenergic and Muscarinic Receptors in the Mouse Atrium

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Abstract

© 2016, Springer Science+Business Media New York.Hydrogen sulfide (H2S) is synthesized endogenously, and it has a negative inotropic effect on myocardium of different animal species. Interaction between H2S and adrenergic and muscarinic receptors in regulation of mouse atrium contractile function was investigated in this study. Sodium hydrosulfide (NaHS, 300 μM), the H2S donor, decreased the contraction force of atrium. NaHS did not affect the positive inotropic effect of β-adrenoceptors (β-AR) activation by isoproterenol (ISO, 1 μM). The effect of the H2S donor under β-AR stimulation showed no differences comparison to control values. The agonist of muscarinic receptors carbachol (1 μM) induced a negative inotropic effect and partially prevented the reduction of cardiac muscle contractility by NaHS. Moreover, the effect of carbachol was more pronounced after preliminary application of NaHS. At the same time, after inhibition of β-AR (propranolol, 1 μM) or muscarinic receptors (atropine, 1 μM), negative inotropic effect of NaHS was the same as in control conditions. These results suggest that the H2S effects are mediated by intracellular signaling pathways activated by muscarinic receptors.

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Keywords

Hydrogen sulfide (H S) 2, Mouse atrium, Muscarinic receptors, β-Adrenoceptors

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